

Energy efficiency in the laundry industry



**“The information in
this guide is a ‘must’
for every laundry
operator”**

**Chris Tebbs
Managing Director
Fabric Care Research Association**

Purpose of this Energy Consumption Guide

This guide aims to help laundry operators save money by reducing their energy costs. The guide is based on a survey of energy consumption in laundries by the Energy Efficiency Office of the Department of the Environment.

The survey found that the laundry industry uses over 6.5 billion kWh (23.5 PJ) of energy per year, at an approximate cost of £63 million.

The survey also indicated that those sites which had implemented certain energy saving measures consumed **up to 20% less** energy per kilogram of work processed than those who had not.

This guide explains how you can:

- calculate your energy costs per kg of work;
- compare your energy costs with those of other laundries;
- improve the efficiency with which you use energy in your business;
- reduce your costs and increase your profits;
- help reduce your emissions of carbon dioxide.



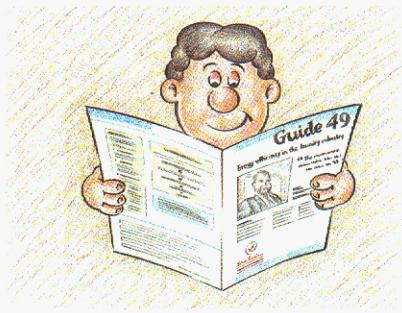
The Importance of Saving Energy

Every laundry operator in the UK is aware of the high cost of the energy used to run their business. The laundry industry's energy bill is almost £63 million a year. To produce the energy for the industry, irreplaceable fossil fuels are burned, releasing into the atmosphere nearly two million tonnes of carbon dioxide, the main gas responsible for global warming.



Saving money by saving energy is therefore of vital importance from both business and environmental viewpoints.

Many people think that energy costs are uncontrollable. However, by following the suggestions in this guide you can control your energy consumption and save money at the same time.



Calculating Energy Costs

To begin to control your business' energy expenditure, you must have a clear idea of how much energy is being used to carry out the basic business activities. Below is a simple procedure for calculating energy consumption:

- measure how much gas, electricity and oil you use;
- convert these amounts to a standard energy unit;
- calculate your total energy use;
- compare your energy consumption with those shown on the chart on the next page.

This method can be used once, simply to enable you to compare the energy efficiency of your business with that of others in the laundry industry. Repeating the calculation at regular intervals allows you to keep track of energy use and record energy expenditure over the year, both of which will help improve your expenditure control.

The method of energy use calculation shown in this Guide will serve as a good basis for building up energy records.

Measuring Energy Used

The main energy sources used by laundries are electricity, gas and oil. To calculate energy consumption, readings must be taken from the electricity and gas meters and the oil tank gauge. Electricity con-

ENERGY USE CALCULATOR FORM					
	START	FINISH	DIFFERENCE	MULTIPLY BY	VALUE IN kWh
Gas meter reading (ft ³)				0.303	
Electricity meter reading (kWh)				1.0	
Oil tank gauge reading (l)				11.4	
TOTAL ENERGY USED					
Weight of work processed				kg	
Energy/kg of work processed (Total energy divided by weight)				kWh/kg	
COMPARISON WITH INDUSTRY AVERAGE					
Your actual energy use for 1 kg of work				kWh/kg	
Less industry mean energy use for 1 kg of work				2.66 kWh/kg	
Difference				kWh/kg	
IF POSITIVE THEN CALCULATE ENERGY SAVINGS					
Multiply annual difference by weekly production in kg				kWh	
Multiply by 52 to give annual difference				kWh	
MULTIPLY ANNUAL DIFFERENCE BY THE PRICE YOU PAY FOR YOUR ENERGY/kWh (SHOWN ON YOUR FUEL BILLS) TO FIND YOUR POSSIBLE ANNUAL SAVINGS					

sumption is measured in kilowatt hours, indicated as kWh on most meters. Gas meters usually measure in hundreds of cubic feet (although bills now show kWh) and oil gauges can show litres, cubic metres or gallons.



It is best to calculate energy use over at least one full working week, by taking readings on, say, consecutive Mondays. During the same period the weight of the work and the number of pieces processed should be recorded. It is much more accurate to weigh the actual work rather than to weigh one load and then multiply by the number of loads.

To calculate the energy consumed, you should subtract the meter reading which you recorded at the beginning of the week from the meter reading recorded at the end of the week. In some businesses, there will be separate energy consumption figures for electricity, gas and oil.

Converting Energy Used to kWh

To find your total energy use and be able to make comparisons with those of equivalent businesses, all the energy consumption totals need to be in the same energy unit.

The most common energy unit to use is kWh. Electricity is already in kWh, but other fuels should be converted as follows:

- natural gas, measured in cubic feet, should be multiplied by 0.303;
- fuel oil, measured in litres, should be multiplied by 11.4.

Calculating Total Energy Use

Adding together the kWh for each energy source gives the total energy use for your business. This figure, divided by the kilograms (kg) of work processed during the week, gives the number of kWh per kg. It is this figure which is used to compare one laundry's energy efficiency with another's.

The Energy Use Calculator Form above provides an easy-to-use layout for recording the energy measurements and calculating the total energy used in kWh per kg.



Comparing Energy Consumption

In 1993, the Energy Efficiency Office carried out, through the Fabric Care Research Association, a survey of the laundry industry to discover the amount and pattern of energy use in this sector.

A questionnaire was sent out to a range of laundry sites, of different types and sizes, asking questions about the volume of work processed per year, the type of work and the total energy consumption. Questions were also asked about whether or not the site had implemented any of a range of energy saving measures, from a lagging programme to monitoring and targeting.

The questionnaire was sent to sites in all four of the main categories within the industry, ie:

- NHS-type (health care) laundries;
- commercial (large group) laundries;
- commercial (independent) laundries, ie not part of a major group;
- small 'on premises laundries', such as those attached to hotels.

Results of the Survey

The data contained in the returned questionnaires were analysed and the following key points extracted.

- The industry sector uses an estimated 6.53 billion kWh per year (23.5 PJ) at an approximate cost of £63 million.
- The mean energy consumption per kg of work processed (specific energy consumption) is 2.66 kWh per kg.
- The type of work processed has no significant effect on the number of kWh required per kg of work.
- The commercial (Independent) laundries use less energy per kg of work processed than the other three categories, between which there were no statistically significant differences.
- Sites that have implemented certain energy saving measures are using around 20% less energy per kg of work than those who have not.

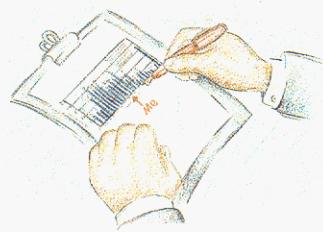
Energy Saving Measures

The survey asked whether or not the respondents had carried out any of 20 different energy saving measures described. Those sites that had implemented a number of these measures were more efficient in their use of energy than those who had not.

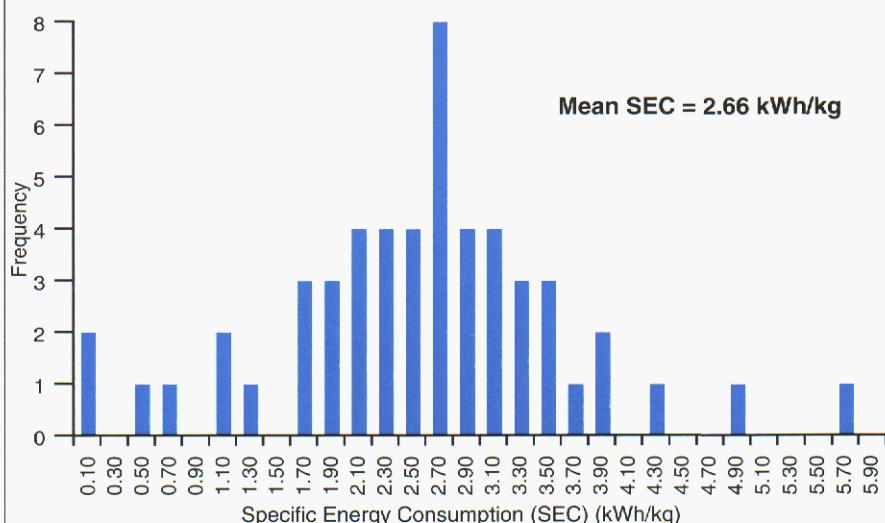
Two groups were identified as being, on average, 20% more energy efficient than the others.

The first group consisted of sites that had installed five or more of the nine key energy saving measures identified in the survey.

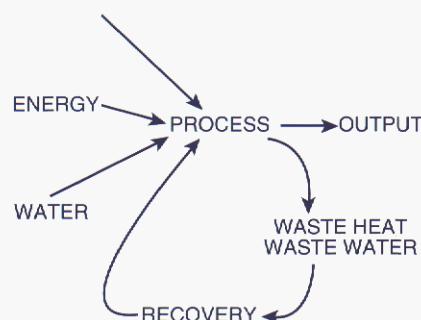
The distribution of energy used per kg of work processed (or specific energy consumption) on sites responding to the questionnaire is shown in the chart below. Having already established the energy consumption per kg of work processed for your site using the Energy Use Calculator Form opposite, you can now compare it with this graph to see how energy efficient you are relative to the rest of your industry.



Mean SEC = 2.66 kWh/kg



MATERIAL



The second group were sites that had concentrated on water recycling and heat recovery, installing at least two of the first three energy saving measures listed below.

• Lag pipework

This is one of the most basic measures, yet it is one of the most important. Having generated steam or hot water, don't waste the heat through uninsulated pipes. Make sure that steam and hot water pipes are properly lagged.



• Fit humidity sensors to dryers

Sensors turn dryers off when the laundry is dry - don't waste energy by over drying your laundry.

• Use direct gas firing of tumble dryers

Gas is cheaper than electricity, and direct firing minimises the amount of waste heat.

• Use direct gas firing of finishing equipment

Use gas to heat presses, etc.

• Install calender covers

Covers will minimise the amount of energy lost to the atmosphere.

• Apply Monitoring and Targeting

Examine where energy is used in your processes, monitor its use and set targets for reducing its use.

Nine key energy saving measures

• Recycle water

Re-use rather than discard hot water; for example, use water from the final rinse for the next pre-wash

• Use integrated water and heat recovery systems

Use the heat content of waste water and recycle the water.

• Recover heat from hot liquid effluent

Use hot waste water to heat clean incoming water via a heat exchanger.

Other energy saving measures

In addition to the nine key measures, there are many other energy saving measures that are worth considering.

• Maintenance

Properly maintained equipment runs more efficiently and is less likely to break down leaving you with an expensive repair bill. This applies to all machines, from steam boilers to dryers to finishing equipment.

• Training and Awareness

Are your staff aware of the cost of the energy they use? Could staff training help reduce waste and increase efficiency?

Properly trained staff get things right first time and reduce reprocessing costs. Untrained operators can waste expensive steam, electricity and compressed air, particularly when using spotting and finishing equipment.

• Further steps

The following steps can also be taken to improve laundry energy efficiency:

- installation of computerised energy management systems;
- garment processing in tunnel washers;
- continuous dust mat processing;
- energy efficient design of a new laundry;
- use of flash steam to generate hot water;
- automatic control of boiler blow-down;
- energy efficient lighting;
- better space heating;
- improved process control;
- low dip levels;
- change of textile fabric for lower drying energy;
- processing complete loads.

Energy Saving Action Plan

Following a few simple steps will help the majority of laundries to save both energy and money.

Determine your current energy use per kg of work



Compare it with others in your industry



Set targets for reducing energy use



Save energy



SAVE MONEY & HELP THE ENVIRONMENT

Following the guidelines in this leaflet should ensure that you get the best energy performance from your business, helping to keep it competitive. Maintaining this position requires a regular review of working practices and maintenance procedures, and an awareness of new energy saving developments in laundry technology. A more detailed description of these guidelines is given in Good Practice Guide 78 'Energy Conservation in Laundering', available from ETSU (see below).

The work described here was carried out under the Energy Efficiency Office's Best Practice programme which is aimed at advancing and disseminating impartial information to help improve energy efficiency.

For further copies of this publication or other Best Practice programme literature, please contact BRECSU or ETSU.

For buildings-related projects: Enquiries Bureau, BRECSU, Building Research Establishment, Garston, Watford WD2 7JR. Tel No: 01923 664258. Fax No: 01923 664787.

For industrial projects: Energy Efficiency Enquiries Bureau, ETSU, Harwell, Oxfordshire OX11 0RA. Tel No: 01235 436747. Fax No: 01235 433066. Telex: 83135.

Information on participation in the Best Practice programme and on energy efficiency generally is also available from your Regional Energy Efficiency Office.

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